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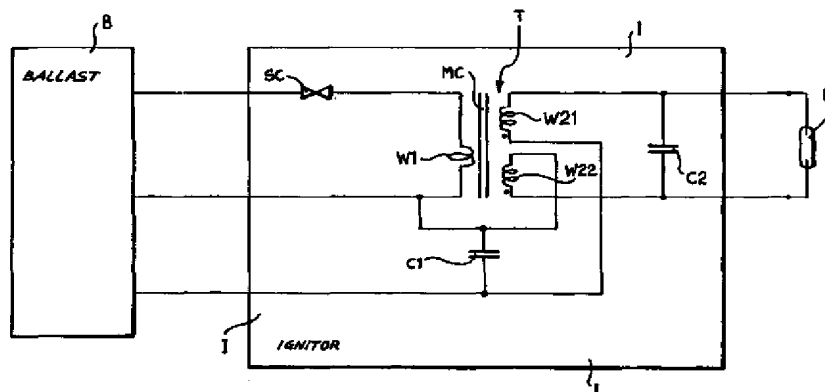
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(54) A device for operating a gas-discharge lamp, particularly for motor vehicles

(57) The device comprises an ignitor (I) including a transformer (T) the secondary winding (W21, W22) of which is connected to the lamp (L) in order to apply a high starting voltage thereto upon ignition, and a filter circuit (F) comprising an inductive component and con-

nected to the lamp (L) to prevent the emission of interference signals. The filter circuit comprises, as the inductive component, the secondary winding (W21, W22) of the transformer (T) of the ignitor (I).

FIG. 2



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## Description

The present invention relates to a device for operating a gas-discharge lamp, particularly for use in motor-vehicle headlamps or lights.

More specifically, the subject of the invention is a control device comprising:

an ignitor including a transformer the secondary winding of which is connected to the lamp in order to apply a high starting voltage thereto upon ignition, and

filter means comprising an inductive component and connected to the lamp to prevent the emission of interference signals.

A known device of this type is shown schematically in Figure 1 of the appended drawings. In this drawing, the gas-discharge lamp is indicated L and the associated operating device comprises a ballast circuit B connected to an ignitor circuit I.

In the device according to the prior art shown in Figure 1, to prevent the emission of interference signals, a filter F is interposed between the ignitor I and the lamp. The filter F is a high-frequency filter with two inductors in series with the conductors which connect the ignitor to the lamp, and with two capacitors in parallel with these conductors.

In the device of Figure 1, the components of the filter F serve solely and exclusively for performing the filtering action which is directed towards limiting the emission of interference and all of these components are for operating at high voltages and are therefore quite expensive.

The object of the present invention is to provide a device for operating a gas-discharge lamp in which filtering to prevent interference radiation is achieved with a reduced number of additional components.

This and other objects are achieved according to the invention by a device of the type specified above, characterized in that the filter means comprise, as the inductive component, the secondary winding of the transformer of the ignitor.

Advantageously, according to a further characteristic of the invention, the secondary winding of the transformer comprises two winding portions and the filter means also comprise two capacitors connected between the opposite ends of these winding portions.

In this solution only the capacitor connected between the ends of the portions of the secondary winding which are connected to the lamp has to be of the high-voltage type.

Further characteristics and advantages of the invention will become clear from the following detailed description, given purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1, which has already been described, is a schematic view of a device according to the prior art,

Figure 2 is a circuit diagram of a device according to the invention, and

Figure 3 is a schematic view of a transformer used in an ignitor and filter device according to the invention.

With reference to Figure 2, the ignitor I comprises a transformer T, particularly of the type known as a Tesla transformer.

The transformer T comprises a primary winding W1 connected to the ballast circuit B. In series with the primary winding W1 of the transformer T there is a discharge device SC.

In the device of Figure 2, the transformer T has a secondary winding comprising two winding portions W21 and W22.

The winding portion W21 has one end connected to the lamp L and the other end connected to one end of the winding portion W22 via a capacitor C1. The other end of the winding portion W22 is connected to the lamp L.

In the ignitor I there is a second capacitor C2 connected to the winding portions W21 and W22 in a manner such as to be substantially in parallel with the lamp L.

The particular construction of the transformer T with the secondary winding split into two portions and the ways in which these portions are connected to the capacitors C1 and C2 enable these winding portions to be used synergically both for applying the extra-high starting voltage to the lamp L, and as inductive components of a high-frequency filter for reducing the emission of interference. In fact, it can easily be seen that, topologically, the circuit formed by the capacitors C1, C2 and by the winding portions W21 and W22 corresponds to the circuit of the filter F according to the prior art.

The solution shown in Figure 2 thus achieves a saving of two inductors in comparison with the prior art. It also makes it possible to use only one high-voltage capacitor (the capacitor C2), whereas the other capacitor (C1) operates at low voltage.

From a constructional point of view, it is generally advantageous to position the filter as close as possible to the lamp L. Accordingly, a first structural solution may consist in the mounting of the entire ignitor I in the lamp-holder associated with the lamp.

Alternatively, at least the high-voltage capacitor C2 may be incorporated in the lamp-holder associated with the lamp L whilst the rest of the ignitor I may be formed as a structurally separate unit connected to the high-voltage capacitor C2 by means of a pair of insulated conductors.

As a further alternative, the ignitor I and the associ-

ated filter capacitors may be physically incorporated in the base of the lamp.

Figure 3 shows a particularly advantageous embodiment of the transformer T.

In this embodiment, the transformer T comprises a magnetic core MC on which the primary winding W1 is wound, this winding being formed, for example, by a single turn wound with a long pitch.

The two winding portions W21 and W22 which form the secondary side of the transformer are wound on top of one another on the core MC on top of the primary winding W1. Each of these winding portions is advantageously constituted by a single layer of turns of conductive wire.

In this solution there is a stray capacitance between one turn and another in each secondary winding portion. However, since the various stray capacitances are in series with one another, the total resulting stray capacitance series is extremely low.

As a result of the superimposition of the winding portions forming the secondary, there is in fact a further stray capacitance between these portions. Moreover, in the topological layout of the filter, this stray capacitance is a capacitance in parallel and therefore also contributes to the filtering effect.

Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated purely by way of non-limiting example, without thereby departing from the scope of the present invention as defined in the appended claims.

## Claims

1. A device for operating a gas-discharge lamp (L), particularly for motor vehicles, comprising:

an ignitor (I) including a transformer (T) the secondary winding (W21, W22) of which is connected to the lamp (L) in order to apply thereto a high starting voltage upon ignition, and

filter means (F) comprising an inductive component and connected to the lamp (L) to prevent the emission of interference signals,

the device being characterized in that the filter means comprise, as the inductive component, the secondary winding (W21, W22) of the transformer (T) of the ignitor (I).

2. A device according to Claim 2, characterized in that the secondary winding of the transformer (T) comprises two winding portions (W21, W22) and the filter means comprise two capacitors (C1, C2) connected between the opposite ends of the wind-

ing portions (W21, W22).

3. A device according to Claim 2, characterized in that it comprises a high-voltage capacitor (C2) connected between the ends of the winding portions (W21, W22) between which the lamp (L) is connected.
4. A device according to Claim 2 or Claim 3, characterized in that each winding portion (W21, W22) is formed by a single layer of turns around a magnetic core (MC), the layer of turns forming one portion (W21) being disposed around the layer of turns forming the other portion (W22).
5. A device according to any one of the preceding claims, characterized in that the ignitor (I) and the filter means (W21, W22, C1, C2) are mounted in the lamp-holder associated with the lamp (L).
6. A device according to Claim 3, characterized in that the high-voltage capacitor (C2) is mounted in the lamp-holder associated with the lamp (L).
7. A device according to any one of Claims 1 to 3, characterized in that the ignitor (I) and the associated filter means (C2, C2) are physically incorporated in the base of the lamp (L).

FIG. 1 PRIOR ART

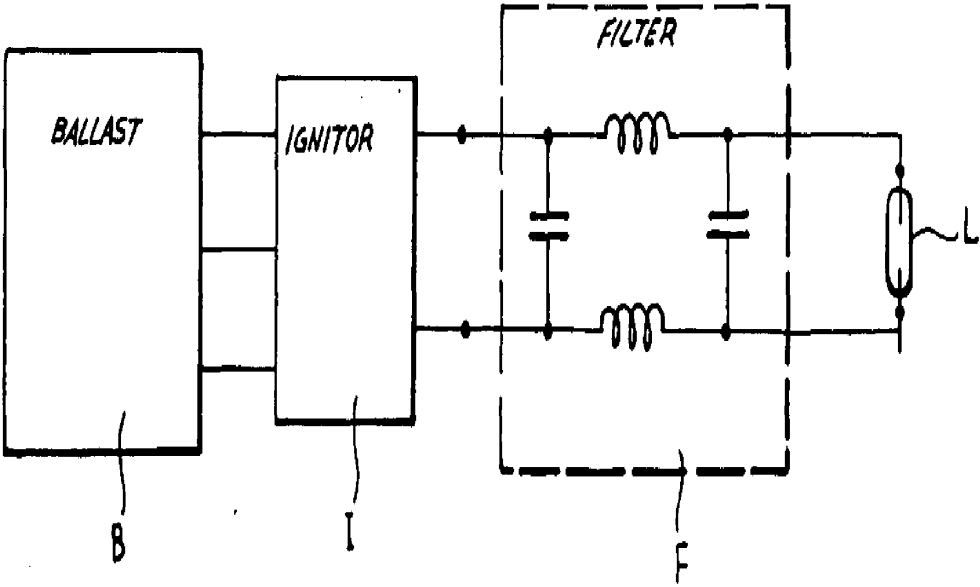


FIG. 2

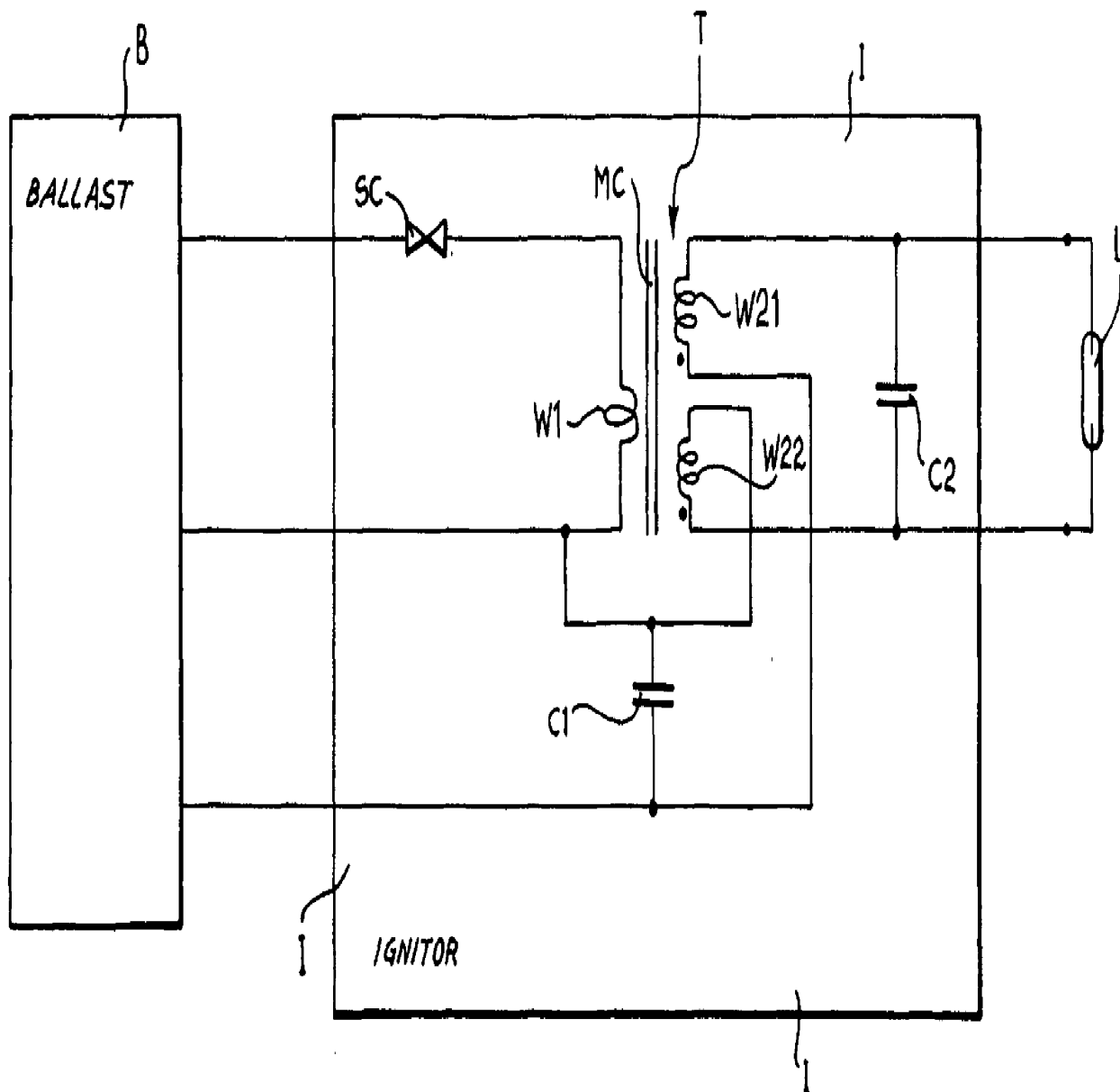
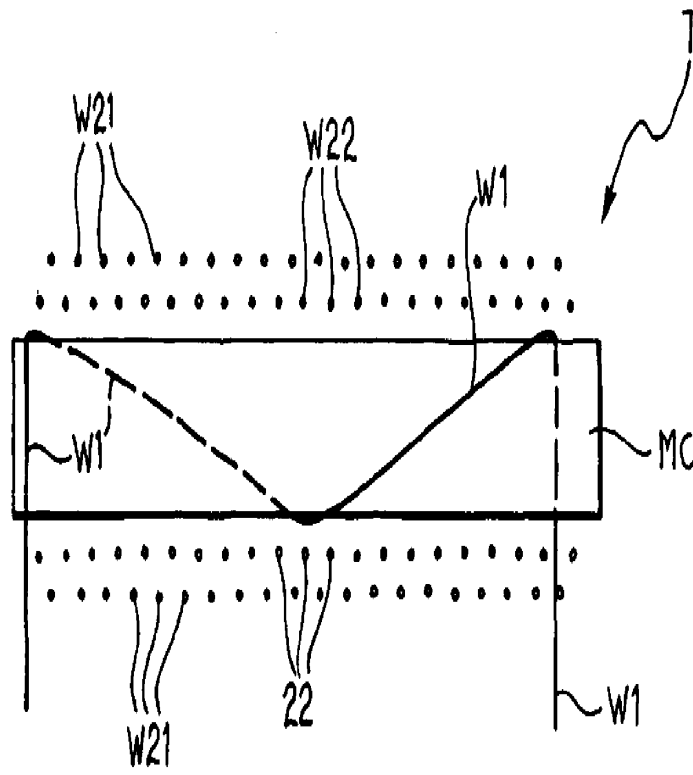


FIG. 3





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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 11 2781

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB 2 276 714 A (BOSCH GMBH ROBERT) 5 October 1994 * page 2, line 28 - page 6, line 14; figures 1-6 *	1,5-7	H05B41/29
A	US 5 055 747 A (JOHNS DOUGLAS A) 8 October 1991 * column 3, line 30 - column 7, line 7; figure *	1-3	
A	WO 92 09183 A (NEON DYNAMICS CORP) 29 May 1992 * page 14, line 1 - page 15, line 30; figures 4,5 *	2,3	
T	DE 196 10 388 A (BOSCH GMBH ROBERT) 18 September 1997 * column 2, line 14 - column 5, line 14; figures 1-4 *	4,5	
A	DE 196 24 724 A (VALEO VISION) 9 January 1997		
A	DE 196 45 752 A (KOITO MFG CO LTD) 15 May 1997		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H05B
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>17 September 1998</b>	Examiner <b>Albertsson, E</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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